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1000 Series Granulators
10 x 12 and 10 x 18 Models

Models Covered:
GP, BP, 1000X, MTG

Part Number: MAN-CA025490
Bulletin Number: GRN1-635
Effective: August 1, 2012

an ACS Group company

WHITAKER BROTHERS SINCE 1945 800-243-9226

Write Down Your Serial Numbers Here For Future Reference:

_____ _____

_____ _____

_____ _____

We are committed to a continuing program of product improvement.
Specifications, appearance, and dimensions described in this manual are subject to change without notice.

DCN No. _____
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Shipping Info

Unpacking and Inspection

You should inspect your granulator for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

In the Event of Shipping Damage

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. **Do not return any goods before the transportation company's inspection and authorization.**

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

If the Shipment is Not Complete

Check the packing list as back-ordered items are noted on the packing list. You should have:

- ☑ Granulator
- ☑ Bill of lading
- ☑ Packing list
- ☑ Operating and Installation packet
- ☑ Electrical schematic and panel layout drawings
- ☑ Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the shipping department immediately**. For immediate assistance, please contact the correct facility located in the technical assistance section of this manual. Have the order number and item number available. *Hold the items until you receive shipping instructions*.

Returns

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

Credit Returns

Prior to the return of any material, **authorization** must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

ALL returned material purchased from **the manufacturer** returned is subject to 15% ($75.00 minimum) restocking charge.

ALL returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

No credit will be issued for material that is not within the manufacturer's warranty period and/or in new and unused condition, suitable for resale.

Warranty Returns

Prior to the return of any material, authorization must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

All returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

After inspecting the material, a replacement or credit will be given at **the manufacturer's** discretion. If the item is found to be defective in materials or workmanship, and it was manufactured by our company**,** purchased components are covered under their specific warranty terms.

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Chapter 1: Safety

1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining your granulator. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The Functional Description section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the granulator. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the granulator. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Operation chapter includes a description of electrical and mechanical controls, in addition to information for operating the granulator safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that your granulator provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

Safety Symbols Used in this Manual

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.

⚠DANGER ***DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.***

⚠WARNING ***WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.***

⚠CAUTION ***CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.***

Figure 1: Safety Tags and warning features

Hazard Alert Symbol	Description/Explanation	Preventative Maintenance
	High Voltage Hazard. The electrical enclosure is supplied with 3-phase electrical power. Use caution when using or maintaining this product.	Every six months inspect all electrical connections for secure attachment. For further information see the Maintenance Chapter in this manual
	Hands could be exposed to a crushing movement.	Every month inspect the shears/blades for any type of wear. For further information see the Maintenance Chapter in this manual
	When equipped with belts and sheaves, hands could become entangled.	Every month inspect the belt(s) for any type of wear. For further information see the Maintenance Chapter in this manual.
	Hands can become entangled or cut if they enter the danger zone of gears or cutting shears.	Every month inspect the shears/blades for any type of wear. For further information see the Maintenance Chapter in this manual.
	The unit can produce continuous noise above 85 dBA and/or produce projectiles under normal operating conditions.	Always wear eye and ear protection when the machine is in operation or performing maintenance.

Mandatory Symbol	Description/Explanation
	Read Operators Manual. This equipment must be operated and maintained by properly trained personnel. The information contained within this manual must be read and understood prior to operating this equipment.
	Lock Out. This equipment is operated with 3-phase electrical power. Therefore, when performing any maintenance operations we recommend following the local standards for performing a lock-out/tag-out procedure.
	Wear Safety Gloves. This equipment operates with sharp blades and rotors. We recommend that technicians use safety gloves while performing maintenance to protect hands from being exposed to these sharp surfaces.
	Wear ear and eye protection. This unit may produce loud and continuous noise and may produce projectiles.
	Do not reach into unit. Reaching into a unit is prohibited while the unit is in operation and may cause serious injury.

1-2 General Safety Regulations

This machine uses knives for the performance of its intended use. Consequently, it can be a dangerous machine to operate and maintain unless these safety regulations are followed.

These regulations should be read, understood, and periodically reviewed by all personnel involved in any way with this machine.

Never operate the machine or job the rotor unless the cutting chamber's covers, discharge chute, and guards are in place and secure. Do not circumvent the safety interlocks.

Never operate the machine or jog the rotor unless the cutting chamber covers, discharge chute, or any guards or covers are in place and secure. Do not circumvent the safety interlocks.

Prior to clearing a jam or performing any maintenance, the motor should be turned off and electrically locked out. Be sure that the rotor has come to a stop. Hands must not be inserted into the machine to clear the jam.

Do not extend any part of the body into feed roll openings or discharge area unless the motors are electrically locked out and the rotor and feed rolls are motionless.

Never extend fingers through holes in the screen.

Be sure that the v-belts are properly aligned and that tension is at its maximum.

Extreme care should be taken to see that all bolts are properly tightened at all times. During the operation of the machine, rotor knife bolts may come loose. Although fine threads are used on the rotor knife bolts, you should still inspect the tightness of the bolts frequently.

This machine is designed for the granulation of plastic materials. Do not feed any other materials into the machine.

1-3 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machine should become familiar with its operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Becoming familiar with materials, inspection, speed limitations, screens, guard maintenance and total user responsibility will assist you in learning potential areas in need of observation for danger.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All caution, warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

1-4 Warnings and Precautions

Our granulators are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this granulator, use good judgment and follow these safe practices:

- ☑ **LEARN AND OBEY** your company's safety policy regarding granulating equipment.
- ☑ **MOVING OR LIFTING THE GRANULATOR:** Although our equipment is built and engineered for great ruggedness in operation, care must be taken when moving the machine along the floor or lifting it. Damage may occur to sheet metal covers, electrical cabinets, or small brackets if pressure is applied to them when moving the granulator. When lifting the granulator, be certain of total machine weight and the capability of the lifting equipment. (See the Granulator Specification Sheets for machine weights and dimensions.)
- ☑ **GRANULATOR LOCATION:** Adequate area for routine maintenance should be provided in order to open the machine for knife, screen, or cleanout service. Proper service area clearances also should allow people who are working on the machine to be clearly visible to others, thereby reducing potential safety hazards.
- ☑ **SAFE HOUSEKEEPING:** The work area must be kept clean and uncluttered during periods of operation or maintenance. No hand tools or other metal objects should be left on or around the machine. Any tools or other metal objects that mistakenly fall into the hopper feed opening can cause severe damage to the internal cutting chamber, rotor and screen components.

- ☑ **SAFETY GLASSES OR A FACE SHIELD MUST ALWAYS BE WORN** when servicing or operating the machine. Although our machines are designed for the maximum in fly back control, caution must be used when operating near the hopper feed opening in order to guard against unexpected material fly back.

- ☑ **EAR PROTECTION** may be required when operating the machine during granulation of very hard or noisy materials. The Occupational Safety and Health Act of 1970 has established guidelines for Permissible Noise Exposures (OSHA 1910.95) that should be followed.
- ☑ **NEVER** attempt to operate the granulator unless it is fully assembled with all guards and interlocks in place and functional.
- ☑ **OBSERVE** all danger, warning, caution and safety labels on the equipment.
- ☑ Upon completion of any machine maintenance, be certain **ALL SAFETY GUARDS AND COVERS** are securely and properly fastened prior to resuming machine operation. All fasteners must be in place and properly tightened. **ANY SHORTCUTS MAY RESULT IN INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT.**
- ☑ **NEVER** wear any loose fitting clothes, neckties, or dangling items such as earrings, belts, or shoestrings. Jewelry, such as wristwatches, bracelets, or rings should NEVER be worn. Long hair must be tied back or placed in a tight fitting hairnet. NEVER lean against or rest hands or feet on the granulator when it is in operation or open for maintenance. NEVER stand on the granulator when it is in operation.
- ☑ **ROTATION OF MOTORS:** The correct rotating direction for the granulator motor is clearly marked on the machine. Always check for proper rotation of motors. Incorrect rotation direction can cause severe damage.
- ☑ **ELECTRICAL GROUNDING:** All electrical equipment on the granulator must be grounded in accordance to all local codes and Article 250 of the National Electric Code.

- ☑ **ALWAYS DISCONNECT AND LOCKOUT** the main electrical power to the granulator before performing any service.
- ☑ **SAFETY INTERLOCKS MUST NOT BE BYPASSED.** The mechanical and electrical safety interlocks ensure the safety of personnel. They should never be tampered with or removed for ANY reason. They should be checked frequently by a qualified mechanic for proper operation.
- ☑ **NEVER** modify the machine configuration or any individual component without written notice from the factory.

For further information on granulator safety, installation and operation, see the *American National Standard for Plastics Machinery—Granulators, Pelletizers, and Dicers Used for Size Reduction of Plastics—Construction, Care, and Use*. ANSI B151.11-1982.

We have long recognized the importance of safety and have designed and manufactured our equipment with operator safety as a prime consideration. We expect you, as a user, to abide by the foregoing recommendations in order to make operator safety a reality.

⚠WARNING

Additional Warning:

The process of granulating and conveying materials inevitably creates dust levels that could potentially cause a hazard if certain procedures or precautions are not followed. Hazardous dust is defined as any material particle 420 microns or smaller (less than 40 mesh or .0164") which is dispersed in air or collected on surfaces more than 1/32" thick.

The following are some precautions that should be followed to avoid any dust related hazards.

1. Always use the largest granulator screen or regrind particle size for your process. The larger the screen size, the less dust will be generated.
2. Know the specifics of the material you are granulating. If your material is especially dusty, inquire about other equipment that may help in controlling the dust levels.
3. Keep the area around the granulator clean by minimizing leaks from the machine or conveying/collection system. It is suggested that an industrial vacuum be used as needed to keep the area clean.
4. When cleaning the granulator for color or material changes, an industrial vacuum is recommended. Do not use compressed air to blow off material on machine surfaces.
5. Establish frequent knife gap maintenance procedures. Different materials have different effects on knife wear and ultimately the operating knife gap. Large knife gaps (2 or 3 times the original setting) can generate higher dust levels.

Also note that the granulating process can generate heat sufficient to melt materials and potentially cause fires or explosions.

The following are some precautions that should be followed to avoid any fire/explosion related hazards.

1. Feed process materials at the appropriate rate consistent with the granulator throughput capacity and screen size used for your material. Overfeeding can cause jam ups and/or melting of process material which can outgas potentially explosive gas.
2. Monitor pneumatic conveying systems used to convey granulate from the granulator. Loss of conveying can cause a material back up and ultimate melting and gas offing.
3. Maintain proper knife gaps on the granulator. Small knife gaps can result in knife collisions which can then cause excessive friction, which heats the process material, and may cause potential ignition.

4. Based on the characteristics of the material being processed, consider the use of fire suppression/explosion detection equipment in conjunction with your granulator.

Applicable Published Standards:

- NFPA 650 Standard for Pneumatic Conveying Systems for Combustible Particulate Solids
- NEPA 69 Standard on Explosion Prevention Systems
- NFPA 654 Standard for the Prevention of Fire and Dust Explosion from the Manufacturing, Processing & Handling of Combustible Solids
- NFPA 499 Recommended Practice for the Classification of Combustible Dust

Chapter 2: Functional Description

2-1 Models Covered in This Manual

This manual provides the necessary instructions for the installation, set-up, and maintenance of our 10 x 12 and 10 x 18 granulators, which covers models: GP, BP, 1000X & MTG.

2-2 General Description

The granulator is comprised of an infeed hopper into which the material to be granulated is fed, mounted on a cutting chamber, in which a series of rotary and bed knives reduce the material to granules, the size of which is determined by the screen holes; the granules fall and collect in the bin below. The operation of the granulator is controlled by a control panel and powered by an electric motor.

The hopper is designed to tilt back, and the screen cradle to swing down for quick access into the cutting chamber.

These compact, easily movable, soundproofed, low-speed granulators are designed for beside-the-press granulation, engineered for hand feed, robot feed, or conveyor feed. The 1000 Series granulators are ideal for reject components from injection, blow molding. And extrusion processes.

2-3 Typical Features and Components

Hopper

The hopper is an upright enclosure bolted to the top of the cutting chamber. The hopper is designed to facilitate the feeding of material to the rotary knives and to protect the operator from material that may be thrown out.

Cutting Chamber

The cutting chamber is a rectangular enclosure comprised the main frame, the bed knives, the bed knife shields, a balanced rotor, and a screen.

The main frame of the cutting chamber carries the bed knives and the bed knife shields. The downstroke bed knife shield is adjustable.

The screen is supported in position below the rotor and acts as a separating barrier to the granulated material, retaining the material in the cutting chamber until the particle size is such that it will pass through the screen holes.

The rotor carries the rotor knives. The rotation of the rotor produces a cutting action between the rotor knives and the stationary bed knives, thus reducing the material size.

Drive System

The rotor is indirectly driven by the motor through v-belts. The motor shaft pulley, v-belts, and the rotor shaft pulley are shielded by safety guards or a sound enclosure.

The motor is mounted on an adjustable sliding base, which is mounted at the left end of the granulator.

Discharge System

The granulated material that falls through the screen is collected by a discharge chute beneath the cutting chamber and directed into a bin. The bin can be removed from the front of the granulator for emptying.

On models fitted with an airveying system (optional), the granulated material that has fallen through the screen is collected in a transition piece located beneath the cutting chamber. The transition piece is connected to a blower, which conveys the granulated material through ducting to the cyclone separator. The cyclone separator allows the granulated material to drop out of the air system into a container.

Base

The base is caster-mounted, with two swivel casters for easy positioning.

2-4 Safety Features

Safety Switches

Safety switches at all access covers are wired into the starter control circuit. The machine cannot be started when these parts are open. However, for safety purposes, the machine should be disconnected from the power lines by a disconnect switch or by removing the plug from its receptacle. Check all safety switches periodically for proper operation.

Safety Tags

A set of metal plates are attached to the machine to warn of potential danger.

Sound Reduction Equipment

Sound reduction equipment will bring the sound level of your machine to within the limitations of the Occupational Safety and Health Act. Material, part configuration, feed rate, and ambient noise level must be specified at the time of inquiry.

Research has been conducted to assess the noise generated by the operation of Sound Enclosed Granulator Models 1012 and 1018.

The testing is intended to determine a General Noise Level during the operation of the granulator. Although the operating noise levels vary with different processed materials, material configurations, throughputs, and conveying methods, the information presented here will give the user an average noise level that operators may be exposed to.

Reference was made to the following technical regulations to establish the noise emitted by the machine:

- S.P.I. Noise Test – Noise Measurement Procedure for Granulators, by the Society of the Plastic Industry.
- UNI7712 – Machine Tools – Determining Noise in the Working Environment – 1977
- ISO3746 – Acoustics – Determination of Sound Power Level of Noise Sources – Engineering method for free field conditions over a reflecting plane – 1981
- ISO3746 – Acoustics – Determination of Sound Power Level of Noise Sources – Survey method – 1979
- DIN45635 – Measurements of airborne noise emitted by machines – Enveloping measuring method – 1972.

The technical specifications of the Sound Enclosed Granulator Models 1012 and 1018 (Figure 2) and the test methods used to establish the noise level generated are described below (Figure 4). Figure 3 gives the mean sound levels Lpm in dB(A) for each model of machine, as well as an average of the sound levels measured at the four positions shown on the diagram below.

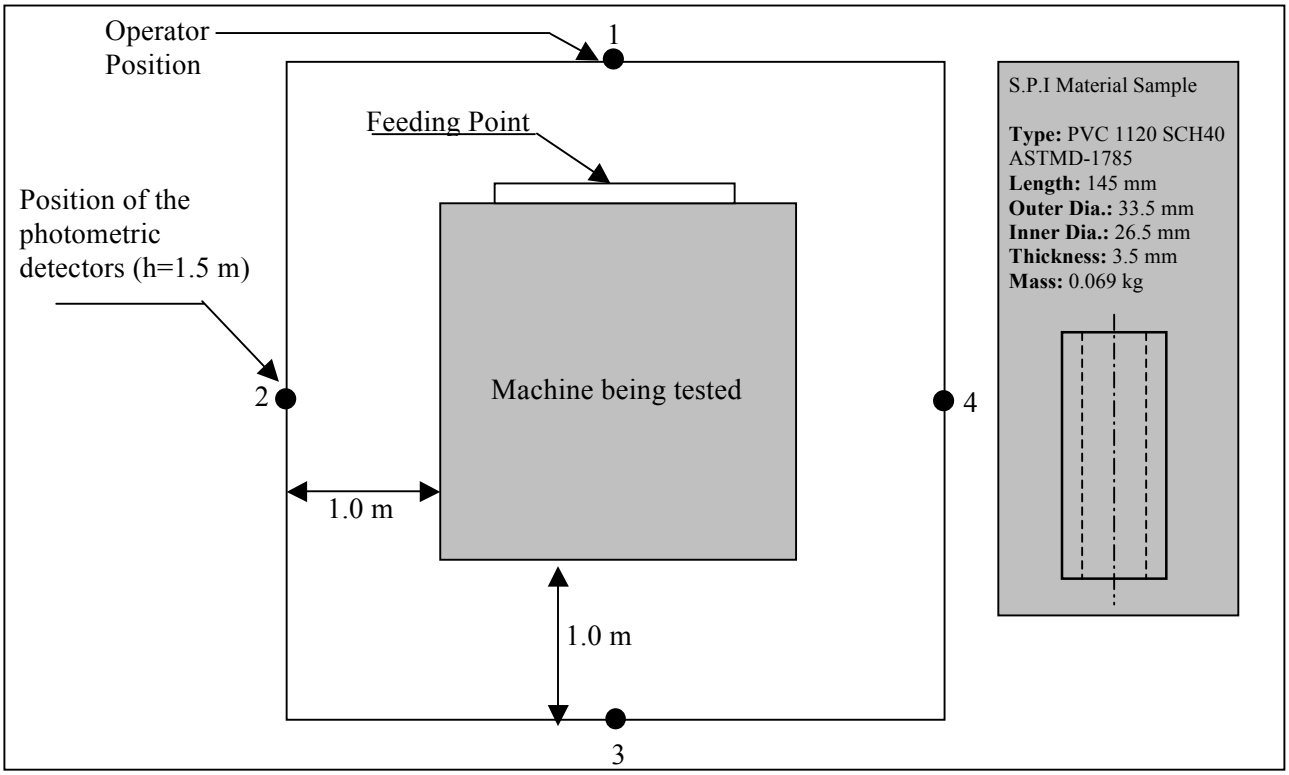
Figure 2: Noise Test Specifications

Model	Motor Power	Impeller Speed	Production *	75% Production	Test Supply (SPI Method)	
	kW	Rev./min.	Kg/h	Kg/h	Pcs. No./min.	Kg/h
1012	5.5	340	140	105	24	99.5
1018	7.5	340	200	150	36	149.0

Figure 3: Average Sound Levels

Model 1012 Sound Enclosed		Model 1018 Sound Enclosed	
Position	Sound Levels in dB(A)	Position	Sound Levels in dB(A)
1	84.3	1	86.0
2	83.6	2	85.6
3	82.6	3	84.1
4	82.2	4	84.1
Lpm	93.2	Lpm	85.0

Figure 4: Noise Test Method



* All Granulators provided with 5/16" (8 mm) Diameter Hole Screen.

Chapter 3: Installation

3-1 Uncrating the Equipment

The complete granulator is skidded for shipment. The bin has been removed from the granulator to facilitate lifting with a forklift truck. The bin is packed with spare parts if required. Refer to the Appendix for detailed dimensional data and pertinent weights.

Prepare in advance the site you have selected for installation of the granulator. Be certain that the area to be occupied by the machine is clean, level, and free of obstructions. The machine should be set on a concrete floor, and care must be taken when moving the machine across a hollow timber floor, so that the point loading of the casters does not cause damage. The site you have selected must have a floor rating to adequately support the weight of the machine. If necessary, use steel shims to level the machine.

Locate the machine so that access is given to electrical components, screen, and hopper. Maintenance personnel should have unobstructed access to the units on which they will be working.

To avoid squeezing people working near a machine, there should be adequate clearance maintained between machines, walls, or partitions. Hinged doors and covers should have full swing. Restrictions may force work in cramped quarters. An off-balance operator with an awkward reach into a partially obscured area is unsafe.

If inspection after shipment has revealed no shipping damage, unpack the unit by removing all hold-downs, tie-downs, bolts, nuts, etc. Remove the envelope with the electrical schematics and instruction manual from the base evacuation area.

You can now have the machine lifted from the skid. To lift and move the granulator safely and correctly, cover any sharp corners or edges, and use the type of equipment that has the most appropriate features and capacity. Use the designated lifting points, and do NOT lift the machine by the hopper handles or guards.

When using a forklift to move the granulator, place the carriage forks under the base. Where a forklift truck is not available, it is possible to use cables or belts, provided that they are strong enough to support the weight of the granulator.

3-2 Belt Tensioning

Tension the belts at the maximum recommended force. Check the tension at least twice during the first day of operation. See Section 5-5 on page 28 for the belt tensioning procedure.

3-3 Electrical Connections

Check serial tag voltage/amperage requirements and make sure your electrical service conforms before making any electrical connections. Make sure that all three phases are wired correctly.

Bring properly sized power leads and grounds from a fused disconnect to the unit. Provide external overcurrent protection to the unit, using circuit breakers or fuses. If you use fuses, make sure that they are dual-element, time-delay fuses, sized according to your electrical code. Refer to the technical specifications in the Appendix for horsepower, voltage, phase, and frequency requirements to determine the size and rating of the supply cable required.

Use the following procedure to complete the electrical connections:

1. Check to be certain that the starter heater elements correspond with the motor requirements. If controls are not supplied, the limit switches supplied on the machine must be wired into the circuit at the common terminal box.
2. Check that the limit switches are closed.
3. Turn switch ON at main power supply.
4. Jog the motor by pressing the START and then the OFF button. This starts and stops the motor.
5. With the electrical power ON, check that the motor rotates in a clockwise direction at the viewing port in the belt guard. If motor rotation is correct, continue to the next step. If rotation is incorrect, complete the following procedure:
    a. Shut power OFF and disconnect incoming power supply.
    b. Reverse any two of the three power line connections to the machine.
    c. Re-connect the incoming power supply line and turn ON the main power switch to recheck motor drive rotation.
6. If an airveying system (optional) is fitted, press the Airveyor START button, and check the blower motor rotation. The blower motor should rotate in a counterclockwise direction. If blower motor rotation is correct, continue to step 7. If blower motor rotation is incorrect, complete the following procedure:
    a. Shut power OFF and disconnect incoming power supply line.
    b. Reverse any two of the three power line connections to the blower motor.
    c. Re-connect the incoming power supply line, and recheck the blower motor rotation.
7. Allow all motors to run up to speed for at least 30 seconds.

3-4 Accessing the Cutting Chamber

You will need to access the cutting chamber before initial startup and for various maintenance procedures. Use the following procedure to access the cutting chamber:

1. Turn the main power off, remove the line fuses, and tag the machine as out of service.
2. Open the front panel and remove the bin.
3. Unscrew the cutting chamber fastener, and carefully lower the screen.
4. Remove the screen, keeping it in a horizontal position.
5. Open the rear cover.
6. Completely pivot back the feed hopper to gain free access to the cutting chamber.

3-5 Closing the Cutting Chamber

After completing any maintenance or adjustments inside the cutting chamber, use the following procedure to close the cutting chamber and resume use of the granulator:

1. Pivot the feed hopper forward over the cutting chamber.
2. Close the rear cover
3. Replace the screen into the screen cradle.
4. Carefully raise the screen, and tighten the cutting chamber fastener.
5. Insert the bin, and close the front panel.
6. Remove the drive belt guard and rotate the rotor by hand from outside the machine to check that no tools, gauges, or loose parts have been left on or in the machine.
7. Replace line fuses, turn power on, and remove the out of service tag from the machine.

3-6 Initial Start-up

This machine has been run under power and tested at the factory prior to shipment. The necessary settings and adjustments have been made so that a minimum amount of setting up or re-adjustment is required when starting up the machine in its new location.

With all electrical, mechanical connections and lubrication requirements having been attended to, the following start-up steps should be carefully carried out before attempting to place any material into the infeed hopper. Use the following procedure to prepare the machine for initial start-up:

⚠WARNING ***Before operating the granulator, insure that the granulator has been correctly assembled and wired.***

1. Access the cutting chamber as described in Section 3-4 on page 20.
2. Thoroughly clean the rust preventative materials or grease from the inside of the cutting chamber and screen.
3. Check all rotor knives to make sure they are properly seated on the rotor and securely fastened. Although they are ground as a set, one knife will probably be .001” to .002” higher than the others. This should be marked and used when adjusting the bed knives for proper clearance.
4. Use a feeler gauge to check the clearance between the rotor and the bed knives by turning the rotor backwards. Rotating the rotor backwards gives a better feel and does not cut the gauge, should the knives be too close. Check the knives on each end only. Proper clearance is 0.005” to 0.008” for most materials; this clearance is slightly greater at the center of the knives.

NOTICE ***Recheck knife clearance after the first 24 to 36 hours of operation.***

5. To make the adjustment on the bed knives, the bed knife bolts should be hand tightened to hold the knife firmly against the knife seat while adjusting the knife forward using push and pull screws. After the clearance is set, torque the bed knife screws to 95 Ft. Lb. (128 Nm) and the rotor knives to 100 Ft. Lb. (135 Nm).
6. With the exposed parts of the machine thoroughly clean, and all knife clamping bolts securely fastened, close the cutting chamber as described in Section 3-5 on page 20.

NOTICE ***After initial start-up, the rotor knife retaining screws should be checked after 8 hours running to be assured that 100 Ft. Lb. (135 Nm) of torque is maintained. Thereafter, rotor knife retaining screws should be checked weekly.***

NOTICE ***The rotor must be rotated at least two rotations every 30 days to prevent brinnelling and corrosion of raceways.***

Chapter 4: Operation

4-1 Start-up

Before starting the machine, check that the rotor rotates freely by rotating it by hand from outside the machine using either the coupling or the sheave depending on the type of drive. Inspect the cutting chamber carefully to insure that nothing has fallen into it. Make sure all screws and bolts are properly secured. Check all electrical connections and motor rotations. See Chapter 3 on pages 18-21 for detailed set-up instructions. Allow all motors to run up to speed for at least 30 seconds.

NOTICE ***If the granulator stalls frequently during use, it may be necessary to adjust the calibration of the "overload." Check the values shown in the electrical diagram.***

4-2 Feeding the Granulator

Feed the granulator through the opening in the hopper. The method of feeding the granulator depends on the physical form and nature of the material being processed.

For maximum efficiency, the granulator should be fed at a rate that is consistent with its capacity; i.e., if the granulator is rated at 60 kg/hr (132 lbs./hr.), then the general feed rate is 1 kb/min. (2.2 lbs./min.). Under these operating conditions, the correct proportions of cut and uncut particles will be present in the cutting chamber.

⚠WARNING

Under no circumstances should the operator attempt to reach into the hopper to dislodge any bridged or jammed material while the granulator is in operation. To clear the hopper of bridged or jammed material, the machine main power must be turned off and the machine isolated.

4-3 Clearing a Jammed Cutting Chamber

Never attempt to free a jammed machine by placing hands on the rotor, rotor knives, or inside the cutting chamber. Hands must be kept clear of the rotational path of the rotor knives.

Good footing on a clean floor is essential and the body should be well braced to guard against loss of balance should the jam suddenly come free. Use the following procedure to clear a jammed cutting chamber:

1. Disconnect and lock out power.
2. Be certain that the rotor is motionless.
3. Open the machine as instructed in Section 3-4 on page 20.
4. Use a pry bar to exert force on the rotor, usually in the direction opposite normal rotation. A leather mallet and a block of wood of sufficient length to keep hands away from path of knives can be used if necessary.
5. Use pliers to remove material from the cutting chamber, keeping in mind that the removal of material may cause rotation of the rotor and rotor knives.
6. After clearing the jam, be certain that the screen and all guards and covers are secured in place before connecting power and starting the machine.

4-4 Shut-down

Use the following procedure to properly and safely shut down the machine:

1. Stop all feeding of material.
2. Allow the granulator to run until the cutting chamber is completely empty.
3. Press the drive motor “stop” button. This shuts off the rotor drive motor.
4. After the granulator has stopped, press the airveyor stop button (if applicable) located at the blower motor.
5. Turn the main power switch to off.

Chapter 5: Maintenance

5-1 Preventative Maintenance Schedule

Check	Frequency
Knife clearance	Weekly
Knife retaining screws for tightness	Weekly
Shield retaining screws for tightness	Weekly
Screen cradle screws for tightness	Weekly
Lubrication of drive motor bearings	Monthly
Screen Wear	Monthly
Belt tension	Monthly
Hopper and cutting chamber screws are tight	Monthly

5-2 Testing the Interlock Switch

The cutting chamber interlock switch ensures that the granulator cannot be running when the cutting chamber or screen cradle are open. When disengaged, the interlocks open the electrical control circuit to the motor and prevent the machine from running.

To test the interlock switch, retract the interlock actuator screw by turning it counterclockwise. Make sure that the end of the actuator screw is visible and clear of any contact. The granulator should stop. If the granulator does not stop, the interlock is not working. If the interlock does not work, the complete mechanism, including the switch, must be removed and disassembled to determine the cause of the malfunction.

5-3 Replacing and Adjusting the Knives

During use, the clearance between the rotor knives and the bed knives will increase due to wear. This is a normal condition that requires re-setting this clearance once or twice before it is necessary to remove the knives for regrinding. Check the knives weekly for wear, clearance, exposure, and screw tightness.

When new knives are fitted to the machine, adjustment after eight hours of running time may be required.

Before assembling a new or reground set of knives, make sure the knife seats and mounting holes are clean. Do not use grease or oil on screws or tapped holes when assembling the knives.

Knives must be replaced in complete sets; otherwise it will not be possible to obtain even clearance between the rotor knives and bed knives.

⚠WARNING ***Before applying a wrench to any knife bolt, be certain that the rotor is blocked to prevent rotation. One such method is to use a block of wood at least 1 1/2" thick between a knife and a fixed portion of the frame.***

Rotor Knives

We recommend that the rotor knife screws be replaced with new screws every sixth knife change to reduce the risk of screw failure due to overstretching. Screws must be replaced with the type specified in the spare parts list. Use the following procedure to replace or adjust the rotor knives:

⚠CAUTION ***Rotor knives should be changed one seat at a time to prevent rotor from being rotated in an out-of-balance condition.***

1. Access the cutting chamber as directed in Section 3-4 on page 20.
2. Remove or set back the bed knives to clear the rotor knives so that the rotor can revolve freely.
3. Remove rotor knife bolts and knives on each seat.
4. Thoroughly clean knife seats.
5. Install new or sharpened knives on each knife seat, making sure that the rotor is still blocked to prevent it from rotating while installing each knife.
6. Lightly tighten the screws and check that a 0.04 mm (0.0015") feeler gauge will not pass between the back of the knife and the knife seat. Tap the knife gently with a rawhide hammer if necessary to close the gap.
7. Tighten the rotor knife screws evenly and torque them to 100 ft. lb. (135 Nm)

NOTICE ***Bolt threads should not be oiled. Wipe thread with an oil-dampened cloth.***

8. Re-check the gap between the back of the knife and the knife seat. If necessary, readjust the knife.
9. Adjust the clearance between the bed knives and rotor knives. (See "Bed Knives" on page 26.)

Bed Knives

We recommend that the same screws and washers be re-used only when the bed knives have been repositioned or re-ground. When blunt knives are discarded and replaced with new knives, use new screws and washers. This will reduce the risk of screw failure due to their overstretching. Screws and washers must be replaced with the type specified in the Spare Parts List. Use the following procedure to replace or adjust the bed knives:

1. Access the cutting chamber as directed in Section 3-4 on page 20.
2. Loosen the lock nuts on the bed knife adjusting screws and back off screws.
3. Loosen and remove the bed knife bolts and lift the upper shield, removing it from the cutting chamber.
4. Remove the bed knives.
5. Before installing and adjusting the bed knives, check all rotor knives to make sure they are properly seated on the rotor and securely fastened.
6. Place the downstroke bed knife and its shield in place and hand-tighten the knife bolts to hold them firmly to the knife seats.
7. Using the push and pull screws to set the knife clearance to 0.005” to 0.008” for most materials; 0.014” to 0.016” for solid wall pipe with 0.187” wall thickness or greater. The clearance should be measured with a feeler gauge at the ends of the knife, by rotating the rotor sheave backwards by hand. The clearance is slightly greater at the center of the knives.
8. Adjust the shield using its push and pull screws so that its front edge is within 1/32” of the bed knife edges.
9. Tighten the bed knife bolts to 95 ft. lb. (128 Nm).
10. Repeat steps 6 through 9 for the upstroke bed knives.

5-4 Sharpening the Knives

Under normal operating use, the cutting edge of the knives will eventually become dulled, resulting in reduced cutting efficiency. The blunt knives may either be re-ground to restore the cutting edge, or replaced with new knives when regrinding is not possible.

NOTICE

The minimum dimensions given for the rotor knife and bed knife cannot be combined to produce a cutting combination. For example, a bed knife ground to its minimum dimension cannot be combined with a rotor knife that is also ground to its minimum dimension.

Rotor Knife Sharpening

The rotor knife can be re-sharpened to the diagram below. The three knives must be sharpened to within 0.076 mm (0.003") of each other. Greater dimensional variations will cause difficulty when setting the knife gap and create other serious complications.

When sharpening, it is not harmful to allow a few small nicks to remain in the cutting edge. Grinding the cutting edge until perfectly clean can sometimes be wasteful.

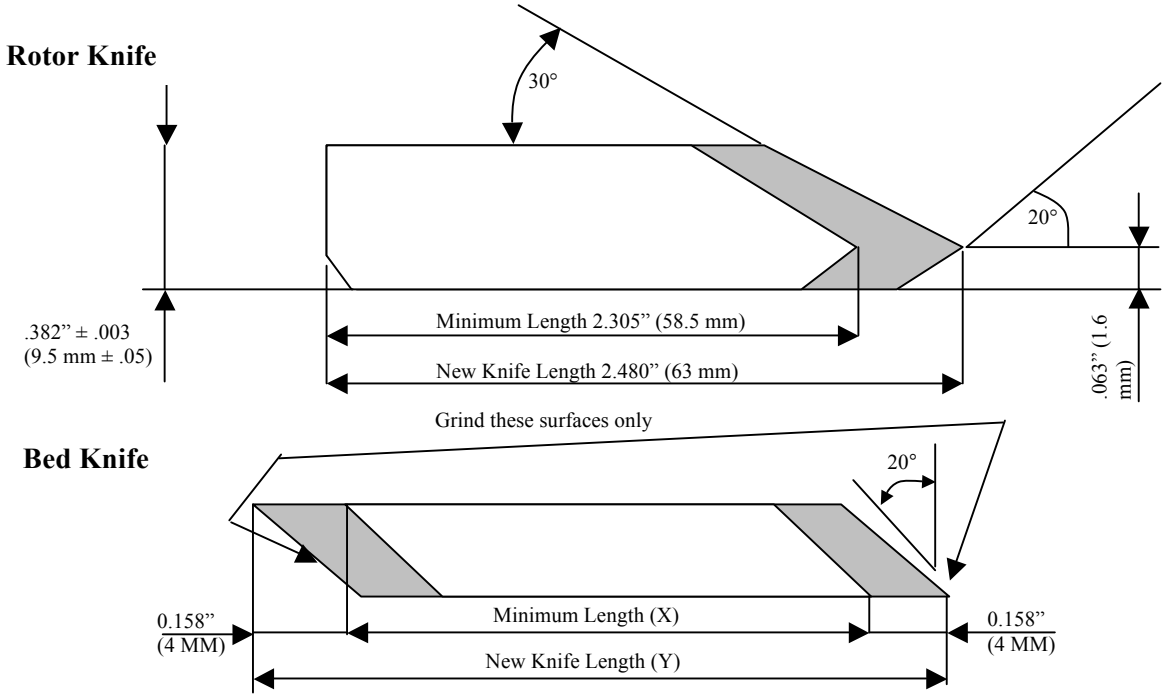
Do not install rotor knives that are smaller than the minimum dimension shown, because the fasteners that secure these knives will interfere with the cutting circle. If the rotor cannot turn, the bed knives will be damaged.

Bed Knife Sharpening

Each bed knife is provided with two cutting edges. When the exposed edges become blunt, the knives can be turned and repositioned to present the new cutting edges. When re-sharpening is necessary, refer to the diagram below.

It is not necessary to grind bed knives to the closely matched tolerance of rotor knives. As with rotor knives, small nicks in the cutting edges will not seriously affect knife cutting efficiency. Bed knives that are smaller than the minimum dimensions shown must be replaced along with the fasteners that secure them.

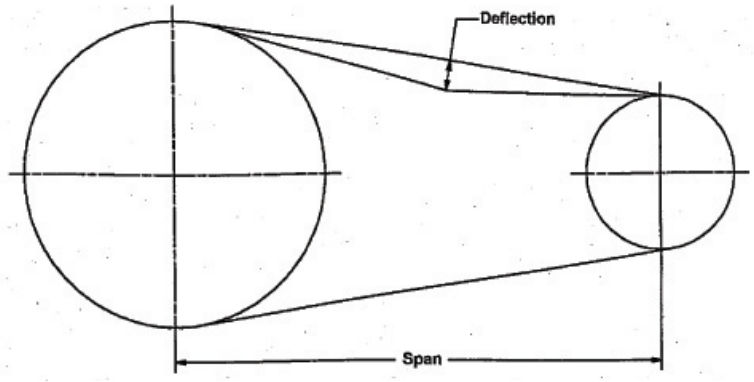
Figure 5: Knife Sharpening Specifications



5-5 Adjusting Belt Tension

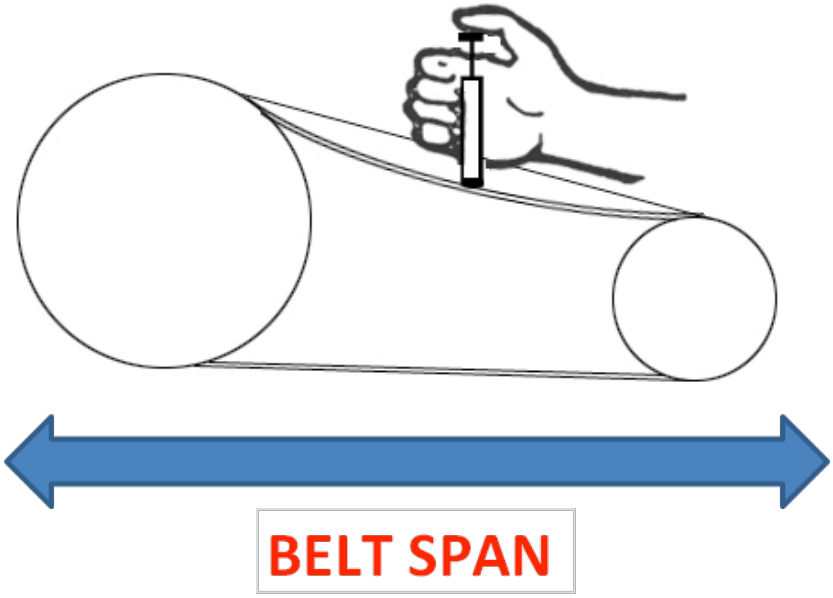
For continuous reliable operation of the granulator, it is important that the belt tension is correct. Correct tension reduces wear on rotor and motor bearings and keeps belt slip to a minimum. Figure 6 gives the recommended force to deflect each belt by an amount equal to the belt span divided by 64. A gauge is available through the sales department to measure the deflection and force. Use the following procedure to adjust the belt tension:

1. Turn off the granulator at the main isolator switch and remove fuses.
2. Remove the cover to gain access to the belts.
3. Turn the adjusting screw on the motor slide base to tension the belts as required (See Figure 6).
4. Re-tighten the screws, making sure the pulleys are in correct alignment.
5. Replace the covers.



1. Verify that the alignment of the pulley is correct. Utilizing a straightedge of sufficient length to span from one pulley to the other, place it along the sides of both pulleys. The entire face of each pulley should fully contact the straightedge.
2. Measure the belt **SPAN** with a measuring tape. Record this dimension in your note book.
3. Using the deflection tester, apply a perpendicular force at the midpoint of any one of the belts to deflect the belt 1/64th of an inch.
4. Calculate the deflection force:

   FORCE[Lb]= SPAN[IN] X (1/64)[Lb/IN]
5. Identify the belt type and measure the small sheave diameter. Look up the proper model belt deflection force table and find out what the force is supposed to be.
6. The motor position should be adjusted until the actual deflection force matches the force listed in the table.



⚠CAUTION

7. In no case should the belts be over tensioned, as this can significantly reduce belt and/or bearing life

Figure 6: Belt Tensioning Information

BELT CROSS **SECTION**	***SMALL SHEAVE*** **DIAMETER RANGE**	***DEFLECTION FORCE*** **(Lbs)**
3VX	3.65-4.12	6.4
	3.7	7
	4.50-5.60	7.5

Chapter 6: Troubleshooting

6-1 Introduction

The utmost in safety precautions should be observed at all times when working on or around the machine and the electrical components. All normal trouble-shooting must be accomplished with the power off, line fuses removed, and with the machine tagged as out of service.

The use of good quality test equipment cannot be over-emphasized when troubleshooting is indicated. Use a good ammeter that can measure at least twice the AC and DC current that can be encountered by the machine. Be sure that the voltmeter has at least minimum impedance of 5,000 OHMS-per-volt on AC and 20,000 OHMS-per-volt on DC scales. Popular combination meters, VOM and VTVM can be selected to provide the necessary functions.

Before making haphazard substitutions and repairs when defective electrical components are malfunctioning, we recommend that you check the associated circuitry and assemblies for other defective devices. It is common to replace the obviously damaged component without actually locating the real cause of the trouble. Such hasty substitutions will only destroy the new component. Refer to wiring diagrams and schematics.

Locating mechanical problems, should they occur, is relatively straightforward. When necessary, refer to the parts catalog section.

6-2 Electrical Faults

Problem	Possible Cause	Possible Remedy
Motor Fails to Start	Supply failure	Check fuses
	Starter inoperative	Check main supply
	Starter overloads or cuts out	Check motor requirements and adjust accordingly
	Safety switches inoperative	Check and adjust as needed
Motor starts but will not take load	Too much belt tension	Check belt tension and adjust as necessary
	Incorrectly connected motor	Check terminal connection with manufacturer's connection diagram and adjust as necessary
	Defective starter winding	Check current in each phase with ammeter, if there is a marked difference in current in one phase, contact motor manufacturer
Motor will start when disconnected from load but not when connected	Worn bearings	Check and replace if necessary according to manufacturer's literature

6-3 Processing Faults

Problem	Possible Cause	Possible Remedy
Stalling	Overfeeding	Reduce feed rate
	Partial or complete screen blockage	Remove screen, clear and inspect for damage
	Insufficient tension on v-belt drive causing belt slip and burning	Check tension of the belt and adjust as necessary
		Check that the motor slide base screws are secure
	Badly blunted or damaged knives	Fit re-sharpened or new knives as required
	Knife setting too wide	Check clearances given and adjust as required
	Installation fault; motor running in reverse direction	Check with direction arrow and re-fit electrical connections to give the correct direction
	Safety switch cut out where fitted	Tighten safety switch setting screw
Material overheating	Check all possible causes under “stalling”	Remedy as shown above
	Screen size too small	Increase screen size
	When granulating rubber, insufficient talc causes freshly cut surfaces to re-adhere	Increase talc percentage rate of infeed
	Blockage in airveyor	Check direction of fan rotation, check venturi and line or chute for blockage

6-4 Mechanical Faults

Problem	Possible Cause	Possible Remedy
Bearing overheating	Excessive tension on the belt drive Lubrication fault	Check tension of belt and adjust as necessary Check lubrication frequency and recommended lubricant
Visible cracks in knife	Incorrect grinding or grinding procedure	Check method of grinding and contact our technical sales department
Knives moving on knife seats	Uneven knife seat surfaces Loose knife screws	Clean up to provide maximum bearing surface Knife screws should not be used more than six times. Replace if there is evidence of stretch
Knives breaking	Cracks caused by incorrect grinding	Contact our technical sales department
Excessive knife wear	Open knife setting	Re-set knives
Screen breakage	Incorrectly seated screen	Check that the screen is seated correctly and fully in its cradle

Chapter 7: Appendix

7-1 Technical Specifications

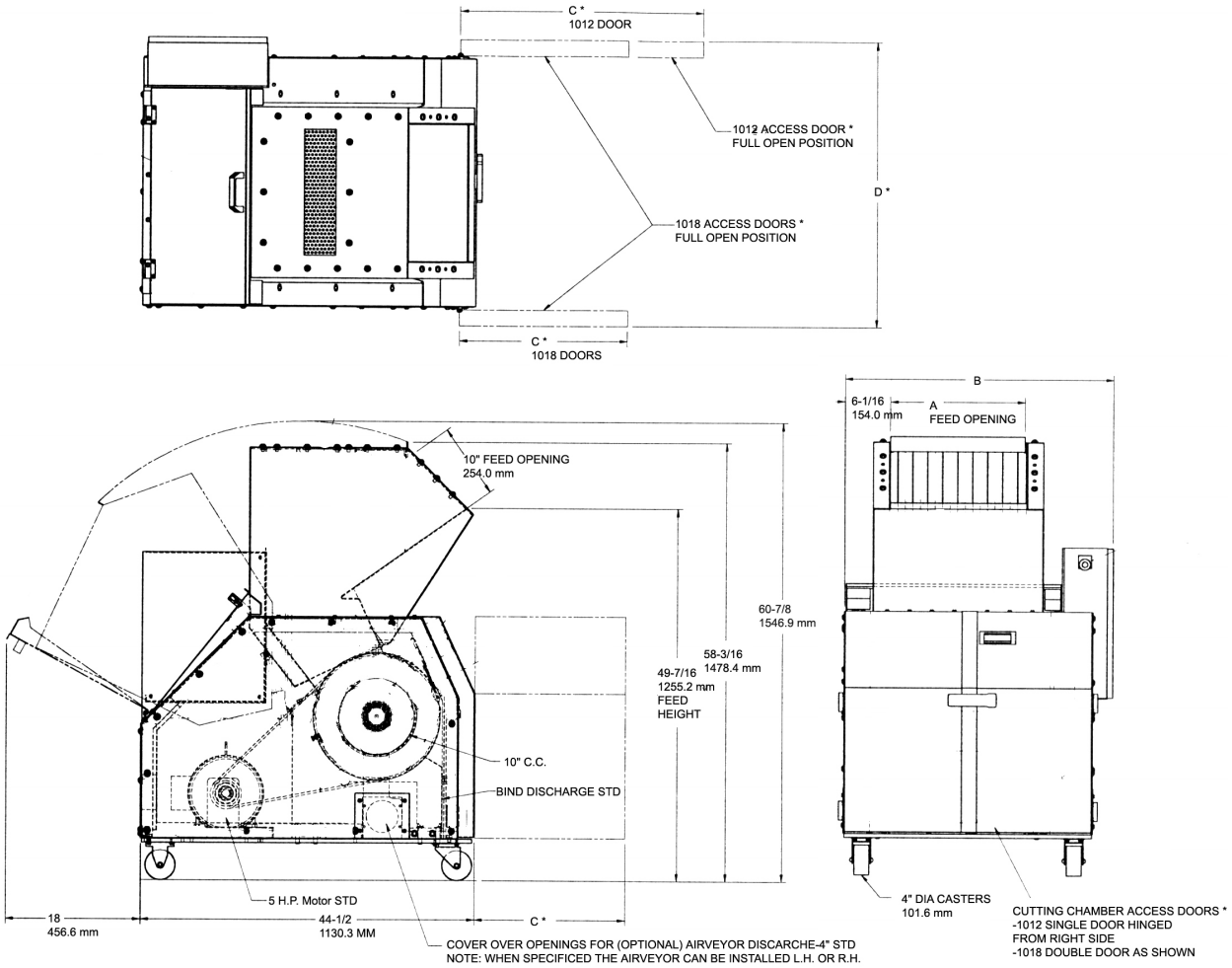
Features

Model	Throat Size	Cutting Circle Diameter	Throughput	Approximate Weight
1012	10” x 12” (254 x 300 mm)	10” (254 mm)	450 lbs./hr. (203 kg.)	1275 lbs. (579 kg.)
1018	10” x 18” (254 x 457 mm)	10” (254 mm)	550 lbs./hr. (248 kg.)	1440 lbs. (655 kg.)

Specifications

	Standard	Standard Options	Special Options
Infeed	Top/Front Feed – Soundproofed		
Cutting Chamber	Tangential, 2-bed knives		
Rotor	3-knife, scooped with end discs		Multi-knife helical, Low speed
Rotor Knives	HCHC, landed		TCSC
Bed Knives	HCHC, 20edge		TCSC
Screen	1/4” dia. pivoting drop-down compact	3/16”, 5/16”, 3/8” dia. or larger	
Base	Caster, modular		
Discharge	Metal Bin	Vacuum bin, Airveyor chute	
Motor	5 HP, TEFC, 3/60/230/460	7 1/2 HP, 10 HP, (15 HP - 1018 only)	Special voltage (e.g. 208, 380, & 415)
Drive Parts	V-belt and flywheel		
Electrical Components	Safety interlocks		
Controls	230 or 460 volt, NEMA 12 (115v P/B)		
Labels	English	French/Spanish	
Accessories	Sound-Proofed (to approximately 85 dBA)		

Dimensions



MODEL	A	B	C	D
1012	12 1/4 (311 mm)	29 7/8 (759 mm)	27 (686 mm)	30 (762 mm)
1018	18 1/4 (464 mm)	35 7/8 (911 mm)	17 3/8 (441 mm)	38 3/16 (970 mm)

7-2 Parts Breakdown

Cutting Chamber

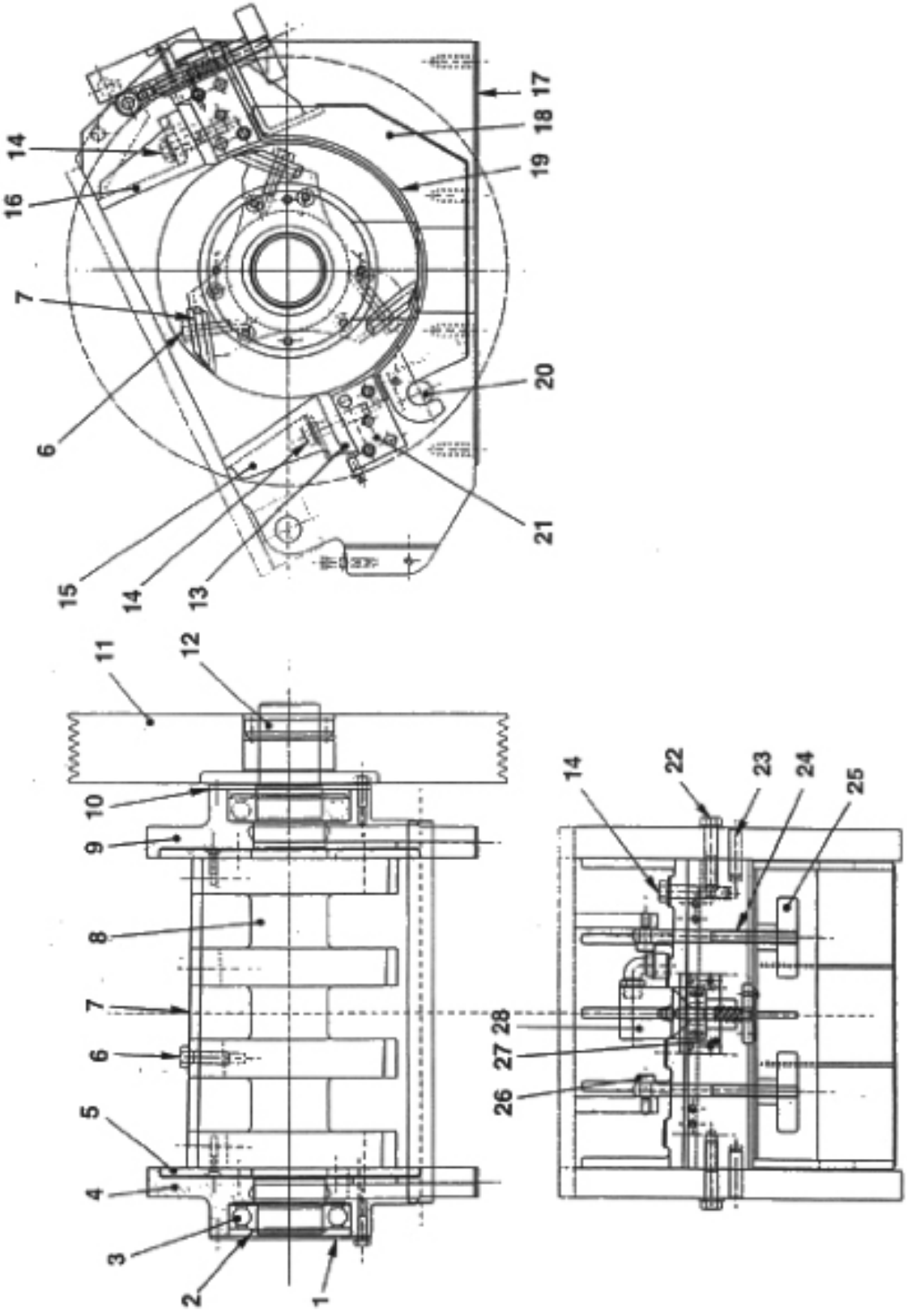


Table 1: Cutting Chamber Parts Breakdown

Ref. #	Description	1012 Quantity	1018 Quantity
1	Bearing end cap NDE	1	1
2	Retaining ring UNI 7435-Ø45	2	2
3	Bearing SKF 6209 ZZ (2RS)	2	2
4	Side plate LH	1	1
5	Rotary disc	2	2
6	Knife screws TE UNI 5740-65 10.9 M12x1, 25x40	12	15
7	Rotor Knife	3	3
8	Impeller	1	1
9	Side plate RH	1	1
10	Bearing cap DE	1	1
11	Pulley operation 3V-6 grooves	1	1
12	Keying instrument RCK 11 60x90	1	1
13	Bed knife	2	2
14	Knife screws TE UNI 5739-65-10.9 – M12 x 60	8	10
15	Rear bed knife shield	1	1
16	Front bed knife shield	1	1
17	Vibration-damping	2	2
18	Screen support cradle	1	1
19	Screen — standard holes Ø8∗	1	1
20	Fulcrum shaft	2	2
21	Bed knife block	2	2
22	Knife screws TE UNI 5737 — M12 x 60	8	8
23	Dowel pin 8x35	8	8
24	Tie rod M12	2	2
25	Knob M12	2	2
26	Screw with ground shank Ø12x15 Umbrako	2	2
27	Electric safety assembly	1	1
28	Safety switch XCKT 591 + Y02	1	1

∗ When ordering a screen, always specify the diameter of the holes required.

Basis and Protection Kit

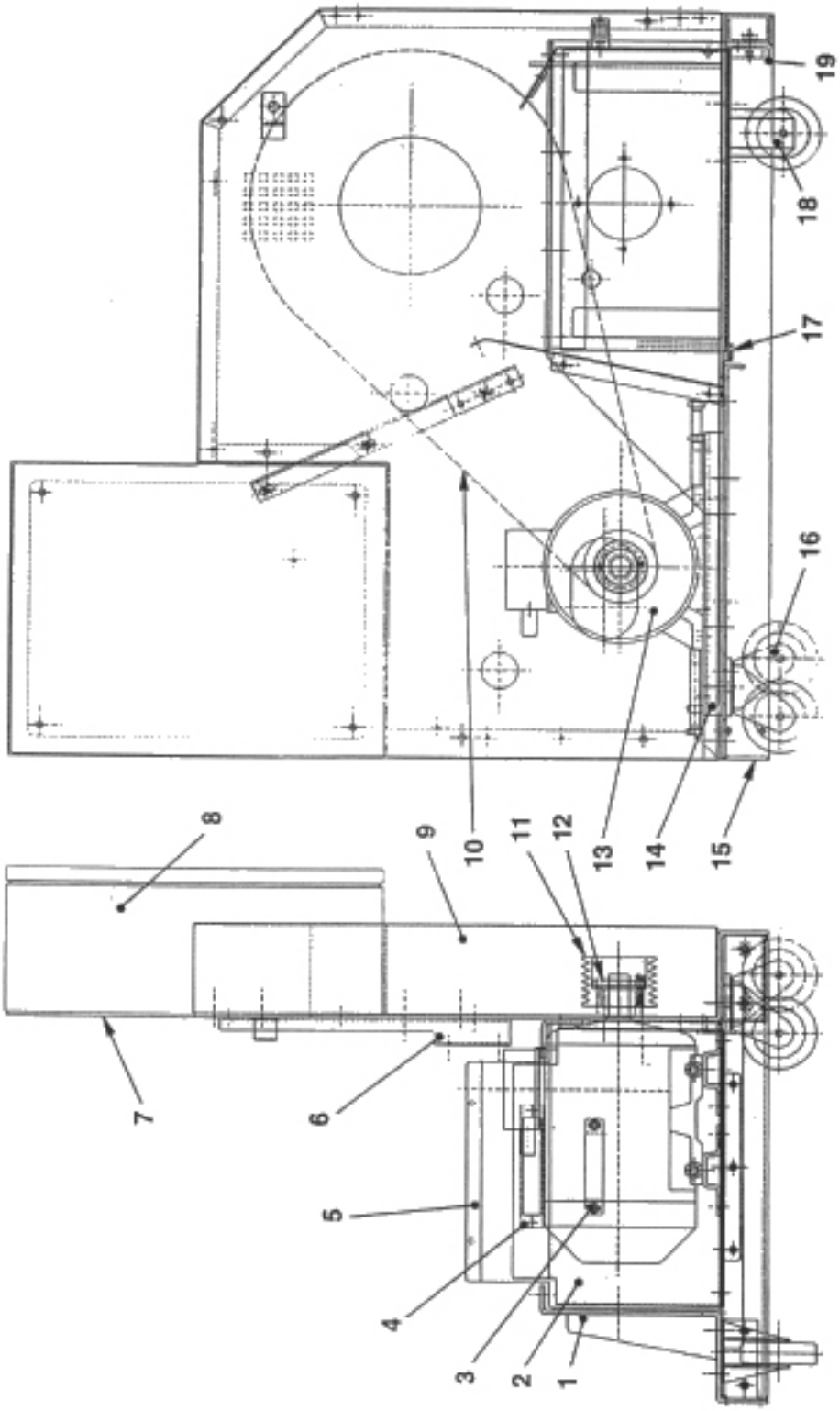
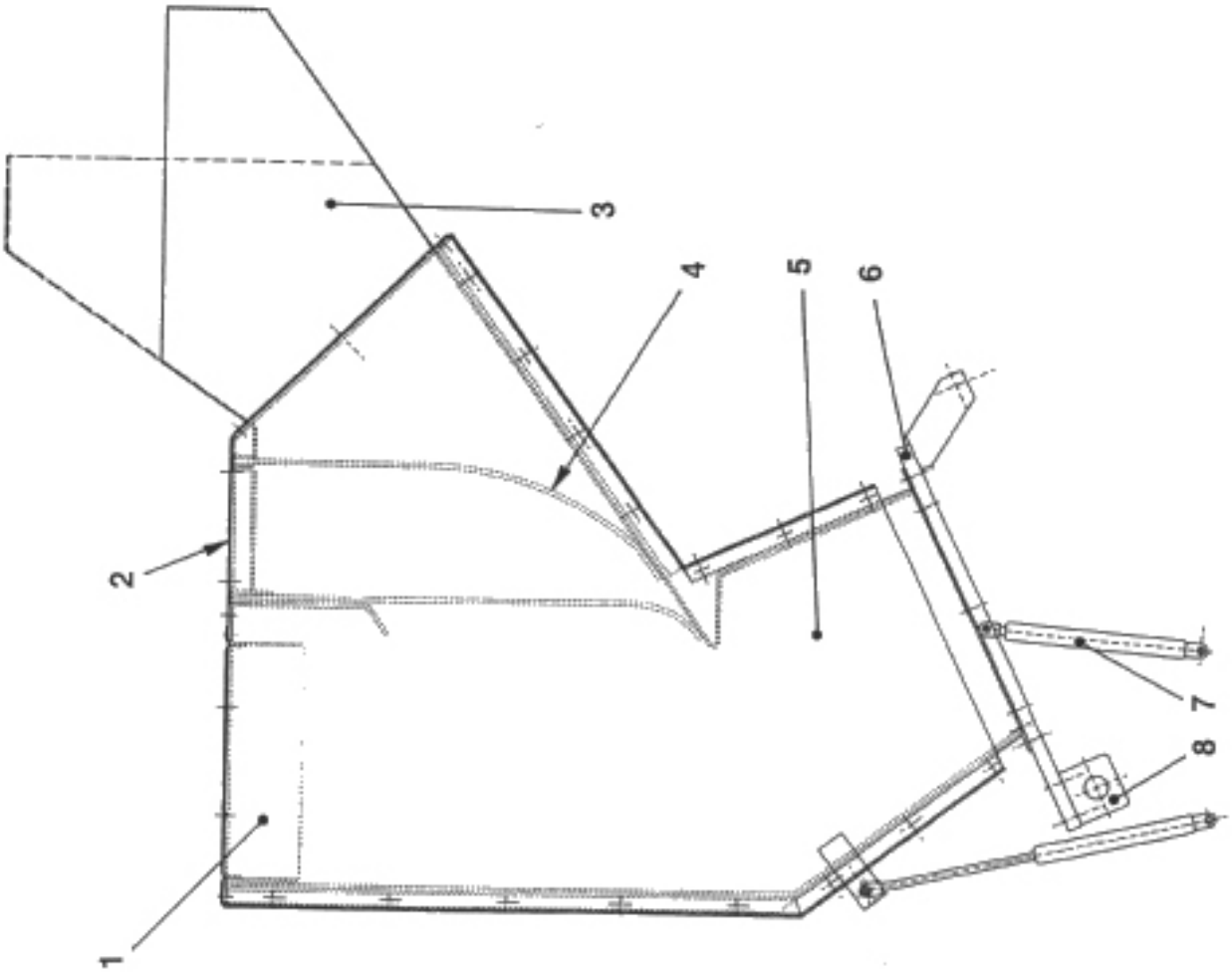


Table 2: Basis and Protection Kit

Ref. #	Description	1012 Quantity	1018 Quantity
1	LH Shoulder	1	1
2	Product drawer	1	1
3	Bridge handle ac 0313	1	1
4	Transparent plate	1	1
5	Rear sheet	1	1
6	Stiffening square	1	1
7	RH Shoulder	1	1
8	Switchboard case	1	1
9	h. basis protection	1	1
10	Belts 3V 800	4	4
11	Motor pulley 3V-6 grooves	1	1
12	Bush 3825	1	1
13	Motor B3 V220/380/415 Hz 50 4P∗	1	1
14	Motor slide	2	2
15	Motor plate	1	1
16	Rotating wheel 68-7700 R+SR/FP 65x30	2	2
17	Sheet for box support	1	1
18	Fixed wheel 65-8202-SF-NL 100x30	2	2
19	Crosspiece for shoulders junction	1	1

Silenced Hopper Kit

∗ When ordering the motor, always state the data shown on its plate.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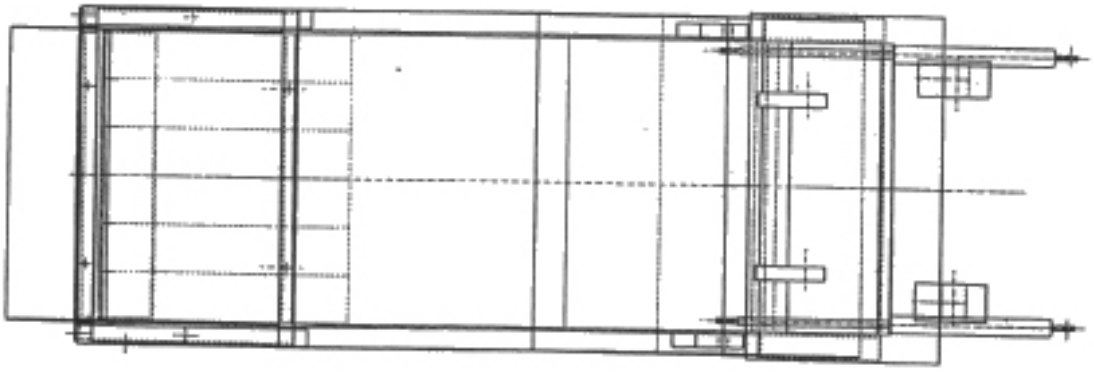


Table 3: Silenced Hopper Kit

Ref. #	Description	1012 Quantity	1018 Quantity
1	Upper guard of pulley	1	1
2	Pulley frame	1	1
3	Hopper block	1	1
4	Flap	2	2
5	Complete hopper	1	1
6	Pulley base	1	1
7	Gas shock absorber	3	3
8	Small block for pulley fulcrum	2	2

Silenced Protections Kit

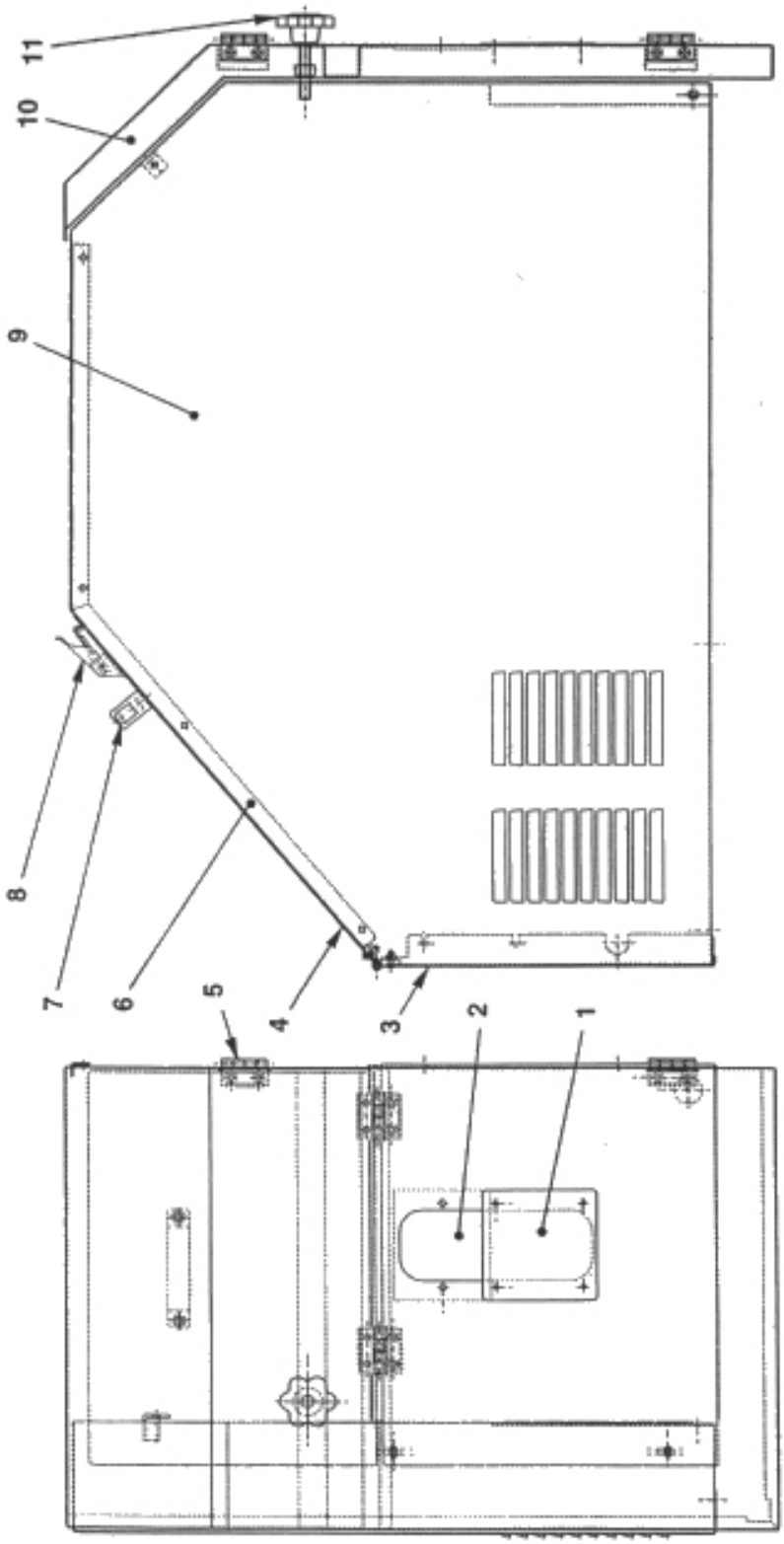
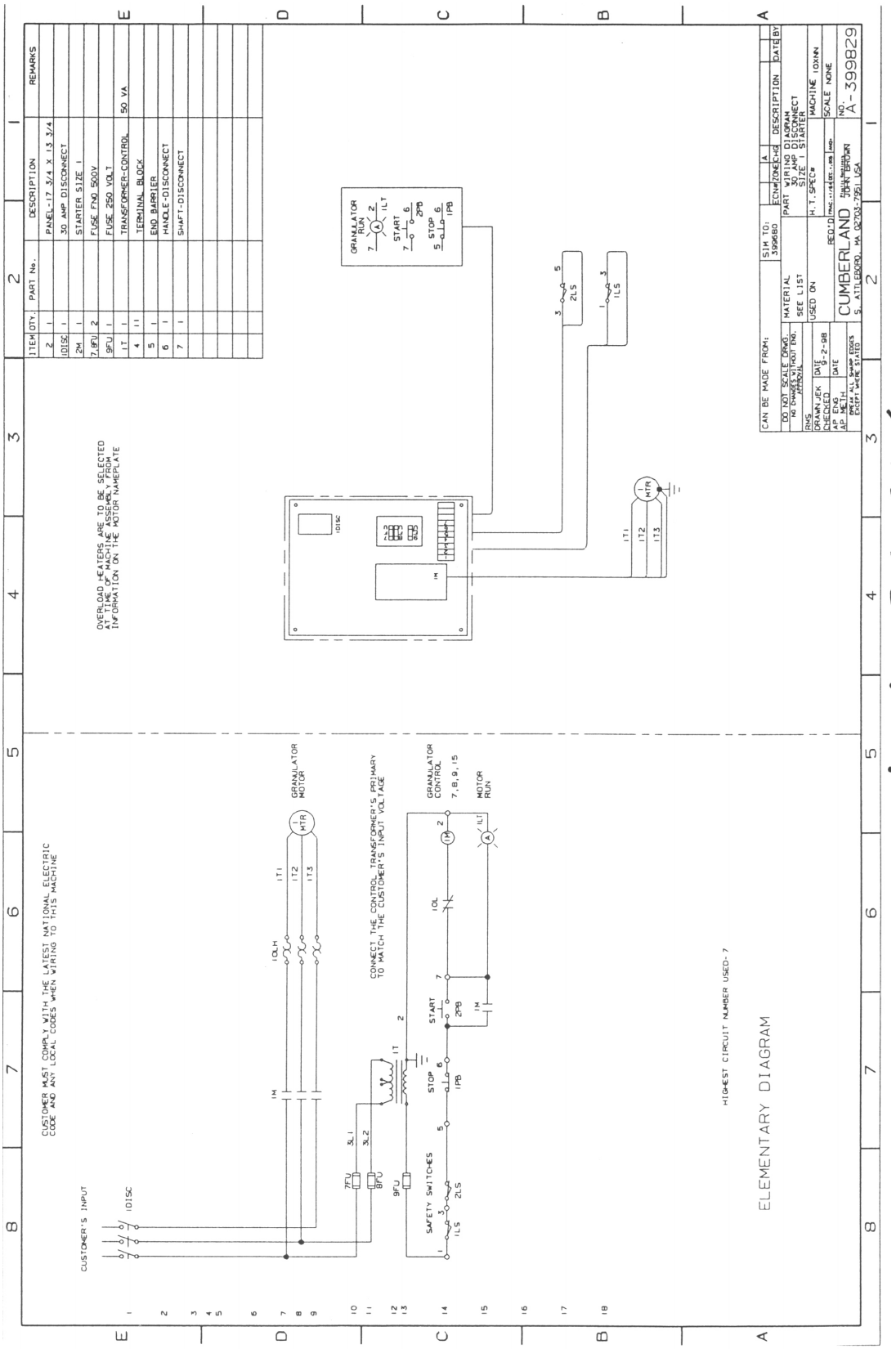


Table 4: Silenced Protections Kit

Ref. #	Description	1012 Quantity	1018 Quantity
1	Square for feeding hole closing	1	1
2	Transparent plate	1	1
3	Rear fixed protection	1	1
4	Rear protection that can be opened	1	1
5	Black hinge that can be screwed 1056-U10	4	4
6	Gasket angle piece	1	1
7	Bridge handle AC0313	1	1
8	Central pipe closing	1	1
9	h. basis protection	1	1
10	Front door	1	1
11	Knob LAGOS AA0114 M12	1	1

7-3 Typical Wiring Diagram



7-4 Technical Assistance

Parts and Service Department

The ACS Customer Service Group will provide your company with genuine OEM quality parts manufactured to engineering design specifications, which will maximize your equipment's performance and efficiency. To assist in expediting your phone or fax order, please have the model and serial number of your unit when you contact us. A customer replacement parts list is included in this manual for your convenience. ACS welcomes inquiries on all your parts needs and is dedicated to providing excellent customer service.

For immediate assistance, please contact:

- North, Central and South America, 8am – 5pm CST +1 (800) 483-3919 for drying, conveying, heating and cooling and automation. For size reduction: +1 (800) 229-2919.
  North America, emergencies after 5pm CST (847) 439-5855
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